DOCUMENT RESUME

ED 224 858 UD 022 631

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TITLE The Impact of School Desegregation Policies on White Public School Enrollment, 1968-1976.
INSTITUTION Wisconsin Univ., Madison. Inst. for Research on Poverty.
SPONS AGENCY National Inst. of Child Health and Human Development (NIH), Bethesda, Md. Center for Population Research.
REPORT NO DP-707-82
PUB DATE 82
GRANT 5P01-HD-0-58776; HEW-100-76-0196
NOTE 53p.; DHEW funded earlier version of paper as a project report in "Studies in Racial Segregation" series.
PUB TYPE Reports - Research/Technical (143) -- Statistical Data (110)

EDRS PRICE MF01/PC03 Plus Postage.
DESCRIPTORS Black Students; *Court Role; Declining Enrollment; *Desegregation Effects; Desegregation Litigation; Elementary Secondary Education; *Enrollment Trends; Geographic Regions; Metropolitan Areas; National Surveys; Public Schools; School Desegregation; School Districts; Urban Schools; *White Students

ABSTRACT

This paper reports the findings of a national study of the impact of school desegregation programs on white public school enrollment from 1968 to 1976. School districts studied were grouped according to region, metropolitan status, and source of pressure to desegregate. It was found that only central city districts that had been subjected to court pressure to desegregate experienced substantial declines in white enrollment. These declines reflect long-term trends, and appear to be associated more with the implementation of a desegregation program than with the actual change in racial isolation (the proportion of black pupils in the school of the average white child) brought about by such desegregation programs. (Author/WAM)

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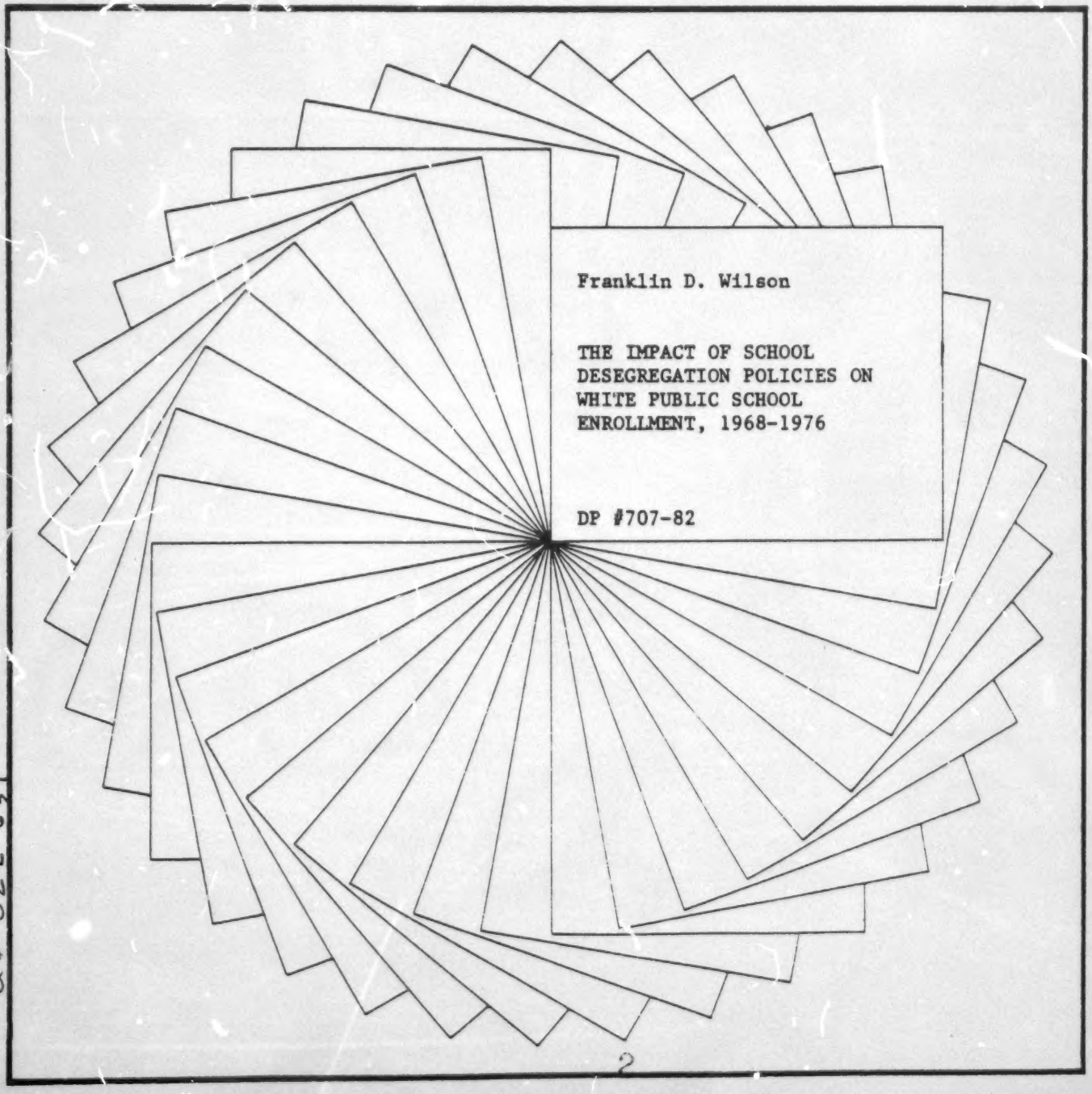

Franklin D. Wilson

THE IMPACT OF SCHOOL DESEGREGATION POLICIES ON WHITE PUBLIC SCHOOL ENROLLMENT, 1968-1976

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September 1982

An earlier version of this paper was issued as a project report in the series "Studies in Racial Segregation," supported by funds granted under Contract No. HEW-100-76-0196, and by funds granted to the Institute for Research on Poverty pursuant to the provisions of the Economic Opportunity Act of 1964. Data acquisition and processing were supported in part by Population Research Center Grant No. 5P01-HD-0-58776 awarded to the Center for Demography and Ecology of the University of Wisconsin by the Center for Population Research of the National Institute of Child Health and Human Development. Conclusions and interpretations are the sole responsibility of the author.

Abstract

This paper reports the findings of a national study of the impact of school desegregation programs on white public school enrollment trends in school districts grouped according to region, metropolitan status, and source of pressure to desegregate. The study finds that only central city districts subjected to court pressure to desegregate experienced substantial declines in white enrollment. These declines reflect long-term trends, and appear to be associated more with the implementation of a desegregation program than with the actual change in racial isolation--the proportion of black pupils in the school of the average white child--that such programs bring about.

THE IMPACT OF SCHOOL DESEGREGATION POLICIES ON WHITE PUBLIC SCHOOL ENROLLMENT, 1968-1976

This paper reviews previous studies of the effect of school desegregation action on white public school enrollment and presents results from a national study on this issue. It seeks to determine whether school desegregation action leads to a reduction in the representation of whites in public school systems, and gives particular attention to the question of time-related responses (year by year) to school desegregation. In addition, an effort is made to assess the effect of program characteristics and the involvement of particular implementing agents in the desegregation process.

The stated or reported acceptance of minorities on an equal basis by whites in various sectors of American society has increased substantially since the early 1960s (see Taylor et al., 1978; Pettigrew, 1979, 1980: Taylor, 1979). Not surprisingly, while white America generally accepts racial equality as an ideal, considerable resistance has accompanied efforts to translate these ideals into reality. At issue appear to be questions of method, timing, and whether whites perceive their own life situation as being directly affected by efforts to achieve integration.

Racial integration in public schools has in general elicited favorable responses from whites, but has given rise to substantial resistance and controversy as to the method that should be used, particularly whether purposeful action induced by external pressure is the most desirable way of achieving that goal. Some writers maintain that court-ordered, systemwide plans to redistribute pupils are self-defeating,

because they undermine the viability of school systems by either causing or accelerating the loss of white students--one element of "white flight." Coleman and associates (1975), for example, report results that are consistent with this expectation, and while their results gave rise to a considerable amount of controversy, the findings of recent studies tend to support their conclusions.

In recent years, the controversy surrounding the adverse effects of school desegregation has considerably subsided. Indeed, many of the most cited antagonists in the debate appear to have reached consensus, answering in the affirmative the question of whether school desegregation leads to substantial white enrollment declines (Farley et al., 1980; Ravitch, 1978; Rossell, 1978; Armor, 1978; Rossell et al., 1981). This apparent consensus has led some reseachers (Rossell, Ravitch, and Armor) to conclude that the answer to the basic question has been settled. I do not concur in this conclusion. My belief is that social scientists have a responsibility to ensure that their observations on important social issues are derived from rigorous tests of hypotheses detailing the specific conditions under which their findings are valid.

A review of the most recent studies on the effect of school desegregation on changes in white enrollment indicates that this criterion has not been met. At issue are questions of conceptualization, methodological approach, and geographic context. For example, while many researchers agree that changes in white enrollment are responsive to the implementation of desegregation programs, this consensus does not extend to the question of the timing, nor the magnitude, of the impact. In addition, it can be noted that virtually all of the relevant studies to date have focused on the largest central city school districts, in which

substantial numbers of black students are enrolled. Few researchers have ventured beyond the boundaries of central cities to ascertain whether declines in white enrollment accompany desegregation in other geographic contexts. Although this focus on large central city districts can be defended on the grounds that the majority of black public school pupils (approximately 58 percent, based on 1976 estimates by the Office of Civil Rights) are concentrated there, these districts represent only 8 percent of the 1,748 districts in the United States that enroll one hundred or more black students (see Wilson, 1982). It is also worthwhile to note that, proportionately, a greater number of non-central-city districts have implemented more extensive desegregation programs than is true of central cities. Hence, I am of the opinion that public debate on the efficacy of school desegregation programs would be greatly enhanced by broadening investigation of both the issues in question as well as the empirical universe for which the issues themselves are relevant. This paper seeks to address these concerns in the hope that subsequent discussions can proceed within a broader area than that offered by previous studies.

PREVIOUS STUDIES

With the possible exception of Coleman, Kelly, and Moore (1975) and Munford (1973), most of the earlier studies report no effect of school desegregation on changes in white enrollment in central city districts, including Bosco and Robin (1974), Farley (1975), Rossell (1975), Jackson (1975), Pettigrew and Green (1976). Since 1976, however, studies reporting no effect during the year of implementation are clearly in the minority. Although several researchers have declared that final agreement has been reached on the basic question of whether desegregation effects are discernible during the year of implementation, results reported thus far are impressive but not definitive.

The most important issues that surfaced during the earlier discussions of the findings of Coleman, Kelly, and Moore (1975) are still central to the current debate. For example, among studies that report effects during the year of implementation, there is considerable variability as to their magnitude. Coleman and associates reported that under certain conditions, desegregation could result in a loss of slightly more than double the normal loss of white pupils. Armor (1978), on the other hand, estimates that the loss rate during the implementation years is four times higher than the normal rate, while Rossell (1978) found that the loss of white pupils can be as high as 14 percentage points over the normal rate. Finally, Farley, Richards, and Wurdock (1980) estimate that desegregation is associated with a 6 percentage point change in white enrollment in large central city districts, and a 2 percentage point change in smaller ones.

Part of the variability among these estimates of implementation-year effects no doubt reflects differences in analytical approaches. Farley and associates (1980) reported that the three analytic models they evaluated yielded different estimates of "desegregation effects" when they were applied to white enrollment trends. Another part of the variation observed among these studies, however, is probably due to biases inherent in their respective operationalization of dependent and independent variables. For example, the estimates reported in Rossell's analysis suffer from serious simultaneous equation bias, due to the fact that her indicator of desegregation impact--percentage of reassigned white pupils--is by definition related to change in white enrollment.[1] The Coleman et al. and Farley et al. estimates are biased by their use of

change in school segregation as a measure of desegregation.[2] Finally, Armor's estimates are biased by his use of decennial census estimates of birth and migration to project enrollment, by failure to distinguish the amount of desegregation which has occurred, and failure to distinguish among the effects of phased-in plans, single-year plans, or the occurrence of multiple plans.

It can be suggested that the policy implication of the impact of school desegregation can best be addressed by focusing on the long-term effect of desegregation rather than any effect which may appear during the year of desegregation. The consequences of implementing desegregation programs in districts in which the major impact is to accelerate the withdrawal of pupils whose parents have planned to do so anyway (within a two to three year period of time) is significantly different from districts in which the impact is temporary (as in a boycott), or in which a district experienced a sustained loss of pupils among households who withdrew their children as a direct result of the implementation of a desegregation program. It is primarily in the case of the latter that the question of whether the objective may be seriously compromised can be raised. In the first two instances, questions involving method, timing, or even uncertainty as to the outcome may be the issues, each of which can be more easily modified than the objective of the program.

Unfortunately, it has not been possible to distinguish between these types of white pupil withdrawal except by inference via analysis of annual enrollment data. Most studies that have used this approach report little or no long-term effect of school desegregation (Rossell, 1978; Coleman, Kelly, and Moore, 1975; McConahay and Hawley, 1977; Sly and Pol, 1978; Farley, Richards, and Wurdock, 1980; U.S. Commission on Civil

Rights, 1977; Fitzgerald and Morgan, 1977).[3] On the other hand, Snyder and Kelly (1977) report that they found significant long-term effects of desegregation programs on white enrollment changes for non-South central city districts. Armor (1978), in his study of twenty-two central city districts, reports that in fifteen and six of these districts, over 50 and 30 percent respectively of the white enrollment losses over periods of at least seven years could be attributed directly to school desegregation.[4] In sum, while the balance of the evidence indicates no long-term effects of school desegregation, this issue should be investigated further using a larger number of districts and a somewhat different analytic approach.

Desegregated school districts exhibit considerable variability in the character and extensiveness of their programs, and in source of pressure to desegregate (court, federal agency, state, school district; see Wilson, 1982). Yet little is known of the effect that these features of desegregation plans have on families with school-age children. If it could be demonstrated that some controllable features of the desegregation process had a significant demographic effect--for example the number of schools affected, the speed of implementation, mandatory voluntary reassignment of minority/white pupils, the use of magnet schools, the character of community education or involvement in the formulation of the plan, reliance on court order or other federal pressure--then educational administrators could better plan to desegregate and avoid or minimize white flight.[5]

In most of the studies cited previously, whether or not a desegregation action occurs is confused with the magnitude of the effect that the action has on reducing racial isolation. This confusion is a result of the widespread use of changes in school segregation (or pupil

reassignment, in the case of Rossell) as an indicator of desegregation impact.

Katzman's (1978) review of a few case studies suggests that the form or instrument of desegregation does not affect the outcome, but Armor's study (1978) suggests that these factors are of fundamental import. Other studies have attempted to identify specific aspects of desegregation plans that may lead to increased white withdrawal, including white pupil reassignment (Rossell, 1978; Lord, 1975; Pride and Woodard, 1978; Giles, 1978); phasing in of plans (Rossell, 1978); elementary versus high schools (Coleman, Kelly, and Moore, 1975); the relation between the percentage of black students and reduction in segregation (Rossell, 1978; Coleman, Kelly, and Moore, 1975; Giles, Cataldo, and Gatlin, 1975; and Giles, 1978); the geographic scope of the plan (Farley, Richards, and Wurdock, 1980; Armor, 1978); and whether whites have access to surrounding suburban areas in which the presence of minority pupils is very low (Rossell, 1978; Farley, Richards, and Wurdock, 1980 Coleman, Kelly, and Moore, 1975; Armor, 1978).[6]

CURRENT INVESTIGATION

The previous section has pointed out some of the major conceptual and methodological problems associated with other investigations. This study seeks to address several of the unresolved issues in a much broader analytic and geographic context than has been possible previously. In this paper, interest centers on the investigation of two interrelated sets of issues. First, it seeks to determine whether school desegregation leads to a reduction in the representation of whites in public school systems, giving particular attention to the question of the temporal character of responses to school desegregation. Second, an attempt is

made to determine whether the alleged adverse effects of school desegregation programs depend on the involvement of particular implementing agencies, e.g., the courts, federal department of Health, Education, and Welfare (HEW), districts, etc. Court-directed school desegregation programs involving busing have been repeatedly identified as the major cause of white enrollment declines. Surprisingly, I am aware of no study which has sought to determine in a comparative context whether the implementing agent or the character of the desegregation program affects outcomes. An analysis of this issue is important, since it will allow a determination of whether agent, program characteristics, or motivation is more important in shaping responses to desegregation.

Data and Methods

Data for the analysis reported below were obtained from a variety of sources, including the OCR Annual School Surveys, the U.S. Commission on Civil Rights Survey of School Superintendents, and a DHEW-funded study of school desegregation activities. Specific features of each of these data sets will be discussed as they are incorporated into particular analyses.

Since 1967, the Office of Civil Rights (OCR) of the U.S. Department of Health and Human Services (DHHS, formerly DHEW) has produced annually (except 1975) a data file containing school enrollment figures by race for a sample of the nation's school districts. This investigation of enrollment trends begins with the statistical manipulation of these data. The extent of coverage of the nation's school districts varies substantially on the annual school files released by OCR. In 1968, 1970, and 1972, the fall survey covered approximately 8,000 school systems enrolling approximately 92 percent of public school students and 98 percent of public school students of minority background. The 1969, 1971,

and 1973 surveys covered smaller samples of school districts selected from the previous year's larger samples. The selection of districts in the odd-numbered years reflected OCR's interest in compliance activity and interest in districts with high concentrations of minority students. The 1974 and 1976 surveys covered approximately 3,000 districts, except that the districts were chosen to permit statistical estimation of enrollment trends in all school districts. (Unfortunately, no survey was conducted in 1975.)

The districts included in the analysis presented below are a subset of those surveyed by OCR. The selection of districts for analysis reflected two major considerations. First, the analysis of enrollment trends requires construction of a longitudinal profile of districts with respect to enrollment level and racial composition of schools. Second, it was considered appropriate to focus only on those districts containing sufficient numbers of blacks to make the analysis of changing enrollment levels meaningful. Hence, only school districts that were surveyed in every year, had at least two schools, and met the following racial enrollment criteria are included in the analysis: (a) districts with a total student population of less than 1,000, in which the average annual percentage black is between 10 and 90 percent; (b) districts with total student populations between 1,000 and 3,499, in which the average annual percentage black is between 5 and 95 percent; and (c) districts with total student populations of 3,500 or more, in which the average annual percentage black is between 3 and 97 percent.

In addition to the annual enrollment data, this study also utilizes limited information on the implementation of school desegregation programs by individual school districts. This information was obtained from two

national surveys--one sponsored by the office of the Assistant Secretary of Planning and Evaluation of DHHS and conducted by The Rand Corporation (Cox, 1979), and one sponsored by the U.S. Commission on Civil Rights (1977). In both surveys, districts were asked to provide information on school desegregation programs implemented during the 1960 and 1970 decades. The information from these surveys, in conjunction with the OCR data, is used to determine whether a major desegregation action occurred.

RESULTS

Previous discussions of desegregation impact have focused almost exclusively on central city school districts, with little attention given to the question of whether implementing agent or the character of desegregation programs affect outcomes in a comparative context. The districts included in this study represent a variety of geographic areas, stratified by desegregation status. Table 1 provides a percentage breakdown of these districts by desegregation status and source of pressure to desegregate. Most of the districts included in the sample had implemented some form of desegregation program by 1976, although the percentages vary substantially by region. (In fact, 71 percent of the districts that desegregated did so between 1968 and 1971.) The four principal implementing agents were involved in all geographic areas; initiatives by state agencies and school districts predominated in the non-South, and federal and state courts were the major initiators in the South.

The classification of districts presented in Table 1 provides the principal analytic context within which the question is pursued concerning whether the implementation of desegregation programs leads to a reduction

Table 1. Percentage of Public School Districts Included in the Analysis, by Geographic Area and Source of Pressure to Desegregate, 1968-1976

Desegregation Status and Source of Pressure to Desegregate	Non-South		South		
	Central Cities	Suburbs or Non-Metropolitan	Central Cities	Suburbs	Non-Metropolitan
Desegregated					
TOTAL	65.62	52.56	92.08	81.82	83.47
State agency or district	42.71	38.46	9.90	18.18	12.42
State or federal court	20.83	6.41	71.29	27.88	24.85
DHEW	2.08	2.56	7.92	13.94	11.70
Unknown[a]	0.0	5.13	2.97	21.82	34.50
Not Desegregated	34.38	47.44	7.92	18.18	16.53
TOTAL DISTRICTS	96	78	101	165	829

Note: See text for description of data sources.

[a] Districts included in this category experienced at least a twenty-point decline in school segregation during a one-year interval between the 1968-1976 period.

in the representation of whites in public school systems. Note that quite a few of the districts are reported as having desegregated but no information is provided on source of pressure to desegregate. Identification of these districts as having desegregated was based on the fact that each experienced at least a twenty point decline (on a scale of 0 to 100; see note 7) in school segregation in a single year between 1968 and 1976. Many of these districts refused to provide relevant information to the DHHS-funded study.

Table 2 provides summary information on levels of school segregation, racial contact, and white public school enrollment level by geographic area and source of pressure to desegregate. Between 1968 and 1976 the level of segregation between black and white pupils declined, and the percentage of black pupils in the school of the average white child (degree of exposure of whites to blacks) increased substantially. [7] Although the average school district in such geographic areas experienced declines in school segregation, it is clear that the implementation of a desegregation program was the most important factor associated with reducing the extent of racial isolation prevalent among black and white pupils in 1968. Not surprisingly, reductions in racial isolation were greater in the South, and in school districts subject to court pressure to desegregate.

Results presented elsewhere (Wilson, 1982) provide some insight into the results reported here. First, courts have been most active and more effective in districts characterized by higher levels of school segregation and high concentrations of black students. With the exception of districts located in the South, DHEW's efforts to reduce segregation levels were only slightly more successful than the efforts of state

Table 2. Summary Statistics on Racial Isolation and White Public School Enrollment Levels, by Geographic Area and Source of Pressure to Desegregate, 1968-1976

Sources of Pressure to Desegregate by Geographic Area	Average School Segregation[a] 1968	Average School Segregation[a] % Change 1968-76	Average Exposure of Whites to Blacks[a] 1968	Average Exposure of Whites to Blacks[a] % Change 1968-76	Average White Enrollment 1968	Average White Enrollment % Change 1968-76
South Central Cities	77.83	-46.59	8.09	352.87	28,640	-20.45
Courts	82.78	-51.32	7.29	446.25	32,310	-21.15
District or State Agencies	69.64	-47.23	9.98	175.81	19,839	-23.15
DHHS	65.96	-36.74	7.51	121.48	32,494	-18.59
Unknown	77.25	-58.64	11.18	237.53	10,277	- 8.00
Not Desegregated	59.99	-16.15	11.53	77.21	13,439	-17.99
Non-South Central Cities						
Courts	65.86	-47.28	10.62	162.21	39,888	-29.22
District or State Agencies	61.76	-24.65	10.79	25.52	35,186	-25.86
DHHS	65.49	-15.45	12.02	56.47	35,535	-30.76
Unknown	---	---	---	---	---	---
Not Desegregated	58.99	-12.00	15.99	47.38	41,178	-29.26
South Suburbs	37.70	-38.12	12.07	351.24	8,981	20.65
Courts	78.84	-50.33	5.74	589.12	14,593	21.25
Districts or State Agencies	55.36	-50.70	12.36	1354.47	7,206	- 0.69
DHHS	69.49	-54.98	9.18	[illegible].15	8,448	18.85
Unknown	60.37	-77.54	15.69	[illegible].74	3,991	17.80
Not Desegregated	30.44	-12.90	16.01	27.24	8,682	30.39
Non-South Suburbs and Nonmetropolitan Areas	47.96	-29.11	17.14	94.79	8,058	-27.70
Courts	58.82	67.75	14.88	274.29	10,922	-50.67
District or State Agencies	42.75	-36.48	17.15	84.63	7,841	-29.25
DHHS	51.81	-81.26	9.32	147.73	8,058	-27.70
Unknown	47.12	-32.45	11.05	49.51	12,124	-11.83
Not Desegregated	50.19	-15.83	18.44	81.00	7,492	-25.51
South Nonmetropolitan Areas	67.54	-53.64	12.13	679.77	2,871	19.64
Courts	87.26	-72.99	7.48	1374.06	3,830	-14.69
District or State Agencies	70.35	-69.48	11.36	468.83	3,579	3.06
DHHS	68.14	-66.61	10.81	623.31	3,687	2.64
Unknown	77.89	-79.77	11.39	676.89	1,790	52.57
Not Desegregated	30.98	-16.69	18.77	101.47	2,886	19.02

[a]See note 7 in text for a description of these measures.

agencies and district-initiated programs. The kinds of districts that different desegregation agents have targeted for program implementation also vary by size and geographic location. For example, programs initiated by districts or state agencies are more likely to occur in districts that are located outside the South and/or have low minority concentration, are small to moderate in size, and in which the amount of effort necessary to achieve racial balance in schools is minimal.

While Southern school districts experienced greater reductions in racial isolation, non-South school districts experienced greater declines in white enrollment levels. Declining birth rates and net outmigration from the North and East probably contributed significantly to these regional differences, as indicated by the fact that even non-South school districts that did not implement desegregation programs between 1968 and 1976 also experienced significant declines in white enrollment (see Taeuber and Wilson, 1978; Long, 1981; Long and Frey, 1982). As was the case with racial isolation, white enrollment declines were greater in school districts subject to court pressure to desegregate, except in suburban school districts located in the South.

Net Change in Public School Enrollment

The question of whether school desegregation activities contributed to the white enrollment declines evident in Table 2 is addressed in the remainder of this paper. The point of departure for manipulating white enrollment trends is a matrix of dimension n by k as represented in Figure 1. In the rows of this matrix are school districts ($i = 1,....,n$), the columns are time periods ($j = 1,....,k$), and the cells represent enrollment figures for white pupils for the ith district and the jth time period. The values in the last row and column are average enrollment

Figure 1

Structure of Data Array for the Analysis of White Enrollment Trends

School Districts	Year of Observation T_{68} T_{69} T_{70} . . . . . T_{75} T_{76}	
D_1	$W_{1,68}$ $W_{1,69}$ $W_{1,70}$ . . . . . $W_{1,75}$ $W_{1,76}$	$\bar{W}_{1.}$
D_2		$\bar{W}_{2.}$
D_3		$\bar{W}_{3.}$
D_4		$\bar{W}_{4.}$
D_5	$W_{5,68}$ $W_{5,70}$ $W_{5,76}$	$\bar{W}_{5.}$
.		.
.		.
.		.
D_n	$W_{n,68}$ $W_{n,70}$ $W_{n,76}$	$\bar{W}_{n.}$
	$\bar{W}_{.78}$ $\bar{W}_{.69}$ $\bar{W}_{.70}$ . . . . . $\bar{W}_{.75}$ $\bar{W}_{.76}$	$\bar{W}_{..}$

values for districts and time periods respectively. Since OCR did not survey districts in 1975, enrollment figures for this year were obtained by interpolation between the 1974 and 1976 years.

Virtually all studies of white enrollment changes have manipulated some combination of the information contained within the matrix presented as Figure 1. The analytic approach employed here is an elaboration of one suggested by Farley, Richards, and Wurdock, (1980; and note 2, below). Essentially, Farley and his associates suggest that most analyses of white enrollment trends confuse two basic components of enrollment changes, e.g., changes which affect the standings of districts relative to each other, and changes which cause enrollment levels for a district to deviate from a linear trajectory. Models that focus on annual, average, or enrollment changes over several years tend to focus primarily on between-district changes, and not changes that disrupt the normal pattern of enrollment level within districts. Farley and associates (1980) argue that desegregation actions should affect within-district, but not between-district, enrollment changes.

In contrast to the approach employed by Farley, Richard, and Wurdock, (1980), we decompose white enrollment for a district into three components. At the aggregate level the number of white pupils enrolled in a district at a specific point in time can be expressed as a function of the following parameters:

$$W_{ij} = \beta_i \bar{W}_{i.} + \beta_j \bar{W}_{.j} + W_e \qquad (1)$$

where W_{ij} is white enrollment in the ith district and the jth time

period; $\bar{W}_{i.}$ is average white enrollment for district i; $\bar{W}_{.j}$ is average white enrollment for the jth time period over all districts; and W_e is white enrollment which is a unique combination of district and time period effects. The W_e component is defined as $W_e = \bar{W}_{ij} - (\bar{W}_{i.} + \bar{W}_{.j})$.

Each of the components on the right-hand side of equation (1) provides information that can be used in combination to summarize district level enrollment trends. The $\bar{W}_{i.}$ term calls attention to the fact that enrollment for a district in a given year is associated with enrollment levels prevailing in other years by a constant. Under most circumstances, $\bar{W}_{i.}$ is the best estimator of district level enrollment for any given year. The $\bar{W}_{.j}$ component captures aggregate trends in the size of cohorts entering and leaving school districts, as can be caused for example by changes in the birth rate. In many instances, annual enrollment changes are a function of a unique set of circumstances--such as annexations, consolidations, area differentials in the net migration of school-age children, etc.--in which case $\bar{W}_{.j}$ will not provide an unbiased estimate of the change which has occurred. Enrollment changes of an unusual magnitude are often unique to a specific district at a given time period. These unusual fluctuations, as captured by the W_e component, cause a district's enrollment level to deviate from an expected trajectory defined by the sum of $\bar{W}_{i.}$ and $\bar{W}_{.j}$.

Usually, in the estimation of models of the form expressed by equation (1), interest centers primarily on the effects of the marginals, e.g., in this case average district and/or time period enrollment values. The (W_e) term is inserted merely to give the estimation exercise completeness. In the analysis performed below, the determinants of variations in (W_e) are given primacy. This reflects our belief that it is

this component of white enrollment level which is likely to bear the imprint of school desegregation activities, since it represents deviations from expected trends. This line of inquiry, though analytically distinct, is consistent with the notion that desegregation tends to disrupt the "normal" pattern of white enrollment within a district in a manner not reflected in the parameters for average district and time periods.

The estimation procedure employed below involves substituting an array of variables in place of the (W_e) term in equation (1). Hence white enrollment for the ith district and the jth time period is hypothesized as being a function of 1) average district enrollment levels; 2) average time period enrollment levels; and 3) a set of variables that effect variations in district and time-specific enrollment trends. One of the advantages of treating white enrollment, rather than its residual (W_e), as the dependent variable is that the effects of average district and time-period enrollment levels are adjusted to take account of the fact that they too are likely to be affected by the implementation of a desegregation program. This is because the implementation of a desegregation program may alter the number of students expected in subsequent years, and thereby alter the values of both ($\overline{W}_{i.}$) and ($\overline{W}_{.j}$). In addition, the focus on white enrollment gives the exercise a completeness which is not possible with any other dependent variable, and the results are more directly interpretable. The estimation equation is of the following form:

$$W_{ij} = \beta_0 + \beta_1\overline{W}_{i.} + \beta_2\overline{W}_{.j} + \beta_3 BLACK_{T-1} + \beta_4 \%EWM_{T-1,T} \qquad (2)$$

$$+ \beta_5 COUNTY + \beta_6 MAN + \beta_7 PLAN + \beta_8 SCHOOL + \beta_9 GRADE$$

$$+ \beta_{10} AREA + \beta_{11} TRAVEL + \beta_{12} BEFORE + \beta_{13} AFTER$$

$$+ \sum_{k=1} \beta_k TIME + e$$

where W_{ij} is the natural log of white enrollment for the ith district in the jth time period; $\bar{W}_{i.}$ is the natural log of average district enrollment; $\bar{W}_{.j}$ is the natural log of average time-period enrollment; $BLACK_{T-1}$ is percentage of total enrollment that was black in the previous year; $\%EWM_{T-1,T}$ is annual percentage change in the proportion of black children in the school of the average white child between T-1 and T (hereafter referred to as exposure of white to black pupils; see note 7 for definition of this measure); COUNTY is one if a district is countywide and serves a central city; MAN is one if a district's major desegregation program included the mandatory assignment of white pupils; PLAN is one if a district implemented more than one desegregation plan; SCHOOL is the percentage of schools involved in the most extensive desegregation plan; GRADE is one if a district phased in its major desegregation program by grade level; AREA is one if the major desegregation plan was phased in by geographic areas; TRAVEL is the percentage of minority students transported under the major desegregation program; BEFORE is percentage change in exposure before the implementation of a desegregation action in years T-n to T-1; AFTER is percentage change in exposure after the implementation of a desegregation action in years T+1 to T+n; TIME is a set of zero/one variables that identifies the temporal status of districts that desegregated in year j. Since W_{ij} is expressed in log form, the regression coefficients for the independent variables can be interpreted as percentage change in W_{ij} produced by a unit change in the former.[8] The terms $\%EWM_{T-1,T}$, BEFORE, AFTER, and TIME require further explanation.

Declines in the level of school segregation may not occur in a one-year time span, because of the possibility that a district may implement several desegregation plans or phase in a single plan over

years. Since annual observations are used to estimate equation (2), the effect of the magnitude of desegregation impact on white enrollment during the implementation year, as estimated by $\%EWM_{T-1,T}$ will be confused with changes which occur in previous or subsequent years. For estimation purposes, $\%EWM_{T-1,T}$ is zero for annual observations reflecting periods before or after the year of desegregation for those districts that desegregated, and BEFORE and AFTER are zero for observations reflecting the year of desegregation and for observations of districts that did not desegregate. Together, $\%EWM_{T-1,T}$, BEFORE, and AFTER allow identification of the effects of the magnitude of desegregation before, during, and after the year of implementation of a major action.

The zero/one dummy variables labeled TIME are included to determine whether white enrollment trends exhibit a particular pattern before, during, and after the implementation of a major desegregation action. These TIME variables were constructed using the pattern matrix exhibited in Table 3. Annual white enrollment for each school district is indexed in reference to the year of implementation of a major desegregation action. For example, T refers to the year in which a major desegregation action was implemented. Districts that desegregated before 1968 and after 1976 have the pattern indicated for (D_{10}). Districts in the "UNKNOWN" categories of Tables 1 and 2 are omitted from the analysis. We deem the occurrence of a desegregation action as a significant political event regardless of whether or not substantial reductions in racial isolation were obtained.

If white enrollment declines are greatest in the implementation year, as previous research suggests, then predesegregation enrollment changes should show a pattern of increasing decline as the year of implementation

Table 3. Pattern Matrix Arraying White Enrollment Data in Relation to the Timing of a Major Desegregatio. Action

	Year of Observation								
District	1968	1969	1970	1971	1972	1973	1974	1975	1976
D_1	T	T+1	T+2	T+3	T+4	T+5	T+6	T+7	T+8
D_2	T-1	T	T+1	T+2	T+3	T+4	T+5	T+6	T+7
D_3	T-2	T-1	T	T+1	T+2	T+3	T+4	T+5	T+6
D_4	T-3	T-2	T-1	T	T+1	T+2	T+3	T+4	T+5
D_5	T-4	T-3	T-2	T-1	T	T+1	T+2	T+3	T+4
D_6	T-5	T-4	T-3	T-2	T-1	T	T+1	T+2	T+3
D_7	T-6	T-5	T-4	T-3	T-2	T-1	T	T+1	T+2
D_8	T-7	T-6	T-5	T-4	T-3	T-2	T-1	T	T+1
D_9	T-8	T-7	T-6	T-5	T-4	T-3	T-2	T-1	T
D_{10}	T-10	T-10	T-10	T-10	T-10	T-10	T-10	T-10	T-10

is approached, and postdesegregation enrollment changes should show a pattern of decreasing decline (and perhaps even recovery) as districts progress beyond the year of implementation. In addition, these variables allow us to distinguish between effects associated with the implementation "event," and those associated with the magnitude of change in interracial contact which occurred as a result of the implementation of a major desegregation action. In previous analyses, most of the attention has focused on the latter effects. Contrary to previous arguments, it is here suggested that families with school-age children may not simply respond to changes in the amount of interracial contact associated with a desegregation action. The implementation of a desegregation action, if it is preceded by controversy, is likely to introduce uncertainty in parents' perceived ability to control the type of school environment their children are or will be exposed to. Hence it is this uncertainty that induces some parents to withdraw their children from the system, even though initially the amount of change mandated by the action may be minor.

Our expectations as to the effect of each of the independent variables on white enrollment is based on previous research findings (see Rossell et al., 1981). Accordingly, it is expected that percentage black, changes in exposure of whites to blacks, the percentage of schools involved in desegregation, mandatory assignment of white pupils, implementation of several desegregation actions, the phasing in of an action either by grade or geographic area, and declines in exposure either before or after the implementation year, will each have a negative effect on white pupil enrollment; whereas average district enrollment, average enrollment for a time period, county district, and percentage of students bused under desegregation who are minority should be positively related to

white enrollment changes.

Table 4 reports analysis of the determinants of white enrollment level by region, metropolitan status, and source of pressure to desegregate. The explanatory power of the analytic model under review is extraordinarily high (with all but two of the multiple R-squared values exceeding (.96), due principally to the inclusion of variables for average district and time period effects).[9] In general, the results reported in Table 4 indicate that the responsiveness of the level of annual white public school enrollment to school desegregation activities is as varied as the subgroups to which equation (2) is applied.

The first issue to be discussed in regard to the results reported in Table 4 is whether white enrollment with respect to the desegregation status variables exhibits a pattern indicating a desegregation effect. The inclusion of these variables permits a distinction between effects due to the implementation of a desegregation action and those associated with the magnitude of change in the amount of interracial contact resulting from the implementation of an action. Under Model I, half of the twelve subgroups do exhibit patterns of variations among the desegregation status variables that indicate desegregation effects, including (1) under federal courts, central cities, and nonmetropolitan areas in the South, and central cities in the non-South; and (2) under district-state agency and/or DHHS, central cities and nonmetropolitan areas in the South, and suburbs and nonmetropolitan areas in the non-South. However, it is only in the case of central cities (South and non-South) subject to court pressure to desegregate that one can observe uniformly statistically significant negative values for the desegregation status variables. Since districts that did not desegregate are assigned values of zero on each of

Table 4. Determinants of Annual White Public School Enrollment Levels by Region, Metropolitan Status, and Source of Pressure to Desegregate, 1968-1976

	CENTRAL CITIES IN THE SOUTH			
	State Agency, District, or DHHS		Federal or State Court	
Variables	Model I	Model II	Model I	Model II
Avg. District Enrollment (Log)	.9748*		.9859*	
Avg. Time Period Enrollment (Log)	.1156*		.1420*	
% Change Exposure, T-1 to T	-.0011		.0001	
% Change Exposure, T-n to T-1	.0007		.0002*	
% Change Exposure, T+1 to T+n	.0011		-.0007	
% Black, T-1	-.0011*		-.0020*	
County District	.0469*		.0306*	
Desegregation Status				
T-8 to T-6	.1554	-.1421	.1029*	.0375
T-5	.0002	-.0029	.1404*	-.0707
T-4	-.0073	-.0135	.0697	-.0322
T-3	-.0273	.0243	.0375	-.0161
T-2	.0065	-.0035	.0214	-.0296
T-1	.0026	.1172	-.0082	-.0672
T	.0872	-.1529	-.0754*	-.0247
T+1	-.0565	-.0152*	-.1001*	-.0041
T+2	-.0786	-.0066	-.1042*	-.0302
T+3	-.0872*	-.0146	-.1345*	.0162
T+4	-.1048*	-.0214	-.1183*	-.0063
T+5	-.1272*	-.0342	-.1246*	-.0178
T+6 to T+8	-.1635*	-.1207*	-.1424*	-.1424*
Mandatory Assignment	.2154		.0341	
% Schools Involved	-.0019		-.0000	
Plan Phased in by Grade	.0000		.0341	
Plan Phased in by Area	.0037		.0333	
Plan Phased in by Year	.0504		-.0070	
% Bused Black	-.0025		-.0007	
District-State Agency	.0287		NA	
DHEW (DHHS)	-.1248		NA	
Constant	-.8524		-1.2160	
Mean White Enrollment (Log)	9.4998		9.7656	
R^2 (Corrected)	.9796		.9795	
Number of Observations	234		738	

(table continues)

*Indicates that the regression coefficient is at least twice the size of its standard error.

Table 4. (Continued)

	SUBURBS IN THE SOUTH					
	State Agency or District		Federal or State Court		DHHS	
Variables	Model I	Model II	Model I	Model II	Model I	Model II
Avg. District Enrollment (Log)	.9819*		.9985*		.9962*	
Avg. Time Period Enrollment (Log)	.0394		.0407		1.2601*	
% Change Exposure, T-1 to T	.0000		-.0001		-.0004*	
% Change Exposure, T-n to T-1	.0008		.0001		.0004	
% Change Exposure, T+1 to T+n	-.0003		-.0001		-.0002	
% Black, T-1	-.0030*		-.0008*		-.0011*	
County District	NA		NA		NA	
Desegregation Status						
T-8 to T-6	.1472	.1311	-.0124	.0418	-.1570	.0469
T-5	.2784*	-.0596	.0293	.0103	-.1099	.3811*
T-4	.2188*	-.0928	.0396	-.0399	.2711*	-.0684
T-3	.1260*	-.0074	-.0004	-.0279	.2028*	-.1616*
T-2	.1185*	-.0599	-.0282	-.0007	.0412	-.0399
T-1	.0586	-.0822	-.0289	.0036	.0013	.0999
T	-.0236	-.0067	-.0253	-.0667	.1012*	-.0788
T+1	-.0302	.0168	-.0419	-.0029	.0224	.0036
T+2	-.0134	.0124	-.0449	.0086	.0260	.0073
T+3	-.0010	.0548	-.0363	.0468	.0333	-.0131
T+4	.0538	-.0112	.0106	.0123	.0214	.0121
T+5	.0426	-.0047	.0228	.0195	.0323	-.0081
T+6 to T+8	.0379	.0379	.0430	.0423	.0242	-.0243
Mandatory Assignment	.1958		-.0650		-.0787	
% Schools Involved	-.0021		-.0002		-.0009	
Plan Phased in by Grade	.2541		.0413		.0000	
Plan Phased in by Area	NA		.0370		-.0176	
Plan Phased in by Year	.3339		.0247		.1286	
% Bused Black	-.0026		-.0003		-.0024	
District-State Agency	NA		NA		NA	
DHEW (DHHS)	NA		NA		NA	
Constant	-.1763		-.3571		-11.4408	
Mean White Enrollment (Log)	7.8604		8.4320		8.0145	
R^2 (Corrected)	.9858		.9915		.9916	
Number of Observations	540		684		477	

(table continues)

*Indicates that the regression coefficient is at least twice the size of its standard error.

Table 4. (Continued)

NONMETROPOLITAN AREAS IN THE SOUTH

Variables	State Agency or District		Federal or State Court		DHHS	
	Model I	Model II	Model I	Model II	Model I	Model II
Avg. District Enrollment (Log)	.9920*		.9947*		.9924*	
Avg. Time Period Enrollment (Log)	.0622*		.1325*		.0799*	
% Change Exposure, T-1 to T	.0000		-.0000*		.0000	
% Change Exposure, T-n to T-1	.0002		.0002*		.0000	
% Change Exposure, T+1 to T+n	.0001		.0002*		.0000	
% Black, T-1	-.0012*		-.0035*		-.0012*	
County District	NA		NA		NA	
Desegregation Status						
T-8 to T-6	.0355	-.0533	.0023	.1941	-.0419	-.0075
T-5	-.0178	.0805	.1963	-.1405	-.0493	.0422
T-4	.0626	-.0155	.0558	.0849	-.0070	.0121
T-3	.0472	.0258	.1408	.0989	-.0051	.0542
T-2	.0730*	-.0178	.2397*	-.1430*	.0594*	-.0465*
T-1	.0552*	-.0163	.0967*	-.0424	.0128	-.0573*
T	.0388	-.0634	.0543	-.0718	-.0444*	.0177
T+1	-.0246	.0034	-.0175	-.0548	-.0268	.0099
T+2	-.0211	.0053	-.0723*	-.0654	-.0169	-.0042
T+3	-.0158	.0069	-.0729*	.0176	-.0211	.0053
T+4	-.0089	-.0072	-.0553	.0053	-.0158	.0066
T+5	-.0161	.0191	-.0501	.0055	-.0091	.0080
T+6 to T+8	.0029	.0029	-.0446	-.0446	-.0011	-.0011
Mandatory Assignment	.0489		.0529		.0196	
% Schools Involved	-.0006		-.0001		.0004	
Plan Phased in by Grade	.0115		-.0413		.0107	
Plan Phased in by Area	-.1317		-.0417		-.1578*	
Plan Phased in by Year	.0495		-.1172		.0481	
% Bused Black	.0005		.0006		-.0012	
District or State Agency	NA		NA		NA	
DHEW (DHHS)	NA		NA		NA	
Constant	-.4111		-.9286		-.5530	
Mean White Enrollment (Log)	7.5016		7.4412		7.4943	
R^2 (Corrected)	.9831		.9321		.9846	
Number of Observations	2169		3096		2108	

(table continues)

* Indicates that the regression coefficient is at least twice the size of its standard error.

Table 4. (Continued)

	NONSOUTH							
	CENTRAL CITIES				SUBURBS AND NONMETROPOLITAN AREAS			
	State Agency, District, DHHS		Federal or State Court		State Agency, District, DHHS		Federal or State Court	
Variables	Model I	Model II	Model I	Model II	Model I	Model II	Model I	Model II
Avg. District Enrollment (Log)	1.0021*		.9820*		.9885*		.9688*	
Avg. Time Period Enrollment (Log)	.9716*		.3109*		1.7111*		1.7862*	
% Change Exposure, T-1 to T	-.0009*		-.0024*		-.0072*		-.0002*	
% Change Exposure, T-n to T-1	.0011		-.0009		.0067*		.0145	
% Change Exposure, T+1 to T+n	-.0012		-.0017		.0592*		-.0092*	
% Black, T-1	-.0007*		-.0008*		-.0021*		-.0035*	
County District	-.0144		.0267		NA		NA	
Desegregation Status								
T-8 to T-6	.0141	.0024	-.0466	.0105	.0633	.0613	-.6041*	-.0160
T-5	.0165	.0086	-.0361	-.6180	.1245	.0457	-.6201	.4424
T-4	.0251	-.0080	-.0979*	-.0086	.1703*	-.0379	-.1778	-.0726
T-3	.0171	.0241	-.1066*	-.0260	.1323	-.0151	-.2504	.0412
T-2	.0413*	-.0009	-.1325*	-.0324	.1173	-.0076	-.2091	-.1352
T-1	.0403*	.0756	-.1649*	-.0862	.1096	.1783	-.3444	1.0820
T	.1159*	-.0572	-.2511*	-.0309	.2879	-.7799*	.7378	-.5783
T+1	.0587*	-.0046	-.2820*	-.1262*	-.4921*	.3301*	.1594	-.1453
T+2	.0541*	-.0014	-.4082*	.1398*	-.1619*	-.0057	.0139	.0244
T+3	.0527*	.0058	-.2685*	.0016	-.1677*	.0779	.0382	-.0072
T+4	.0586*	-.0005	-.2669*	.0939	-.0898	.1120	.0312	.0055
T+5	.0581*	-.0131	-.3609*	-.3609*	.0222	.1671	.0367	-.0613
T+6 to T+8	.0450*	.0449	NA	NA	.1893*	.1893*	-.0247	-.2467
Mandatory Assignment	-.0234		.0000		-.1876		.0000	
% Schools Involved	-.0003		.0001		.0026		.0000	
Plan Phased in by Grade	.0301		.1273		.0327		.3224	
Plan Phased in by Area	.0031		.0849		.0820		-.9167	
Plan Phased in by Year	.0529		-.1115		.1803		NA	
% Bused Black	.0000		.0008		-.0020		-.0217	
District or State Agency	-.0480		NA		-.0194		NA	
DHEW (DHHS)	-.1990*		NA		.3785		NA	
Constant	-9.9835		-3.0182		-15.0310		-15.5673	
Mean White Enrollment (Log)	9.7777		9.9940		8.4050		8.3851	
R^2 (Corrected)	.9928		.9840		.9427		.9683	
Number of Observations	684		477		621		378	

*Indicates that the regression coefficient is at least twice the size of its standard error.

the desegregation status variables, the negative values indicate that districts that desegregated in year (T) had lower white enrollment levels than nondesegregated districts. It is important to note that the central city districts for which a case can be made for desegregation effects are the same ones that have been the focus of most of the scholarly discussion on this issue. Although these results are in a certain respect consistent with those of recent studies, they point out a serious problem in the generalizability of the findings of these studies--namely, that their findings of enrollment loss due to desegregation may be limited to central city school districts subjected to court pressure to desegregate.

The regression coefficients reported under Model II of Table 4 contrast white enrollment at T to that at T+1. If desegregated districts experienced a predictable pattern of enrollment changes, this should be evidenced by the signs and sizes of these coefficients. Although there are certainly differences among the coefficients, most are not statistically significant. This indicates that even in instances where desegregated districts had fewer pupils in a given year than nondesegregated districts, annual enrollments for the former were not significantly different in adjacent years. In other words, enrollment changes that occurred during the implementation year appear to be no different from those which occurred prior to or after that year. However, the absence of an implementation-year effect for these subgroups of districts is also associated with the fact that several of the other variables used to index desegregation activities are also referenced with respect to year of implementation. In addition, it should be emphasized that reference is being made only to the annual increment in enrollment, not to long-term cumulative effects, which will be discussed later.

Changes in the exposure indices are included to assess the impact of the magnitude of change in interracial contact on white enrollment levels. The basic question addressed by these indices is whether the extent of loss of white pupil increases as the average percentage black pupil in their school increases before, during, and after the implementation of a desegregation action. Few of the coefficients for the exposure indices are statistically significant, indicating for most of these districts that the amount of white enrollment loss is not associated with increased interracial contact. One can note that more of the coefficients for increased interracial contact during the year of implementation are statistically significant than those for increased interracial contact before or after this year. In some cases, the coefficients for change in exposure either before or after year of desegregation are statistically significant, but are associated with positive increases in white enrollment.

The most important finding reported in Table 4 with respect to interracial contact is that increases in this variable lead to increased white enrollment loss during the implementation year for three of the four non-South subgroup of districts. In the case of the fourth, suburbs and nonmetropolitan areas under court pressure, the average district lost 9 percent of its white pupils as a result of a 10 percent increase in the exposure of whites to blacks. In the other three non-South subgroups, the average loss in white pupils associated with increased exposure during the implementation year was 1 percent in the case of central cities, and 12 percent in the case of suburbs/nonmetropolitan areas subject to district-state agency or DHHS pressure to desegregate; and 8 percent in the case of central cities subject to court pressure to desegregate.[10]

One could speculate that the South/non-South difference in the impact of increased interracial contact could be associated with differences in the degree of concentration of blacks in residential areas. Until very recently, black residential areas in Southern cities were much more dispersed, which would facilitate the reassignment of pupils to other schools without requiring a large number of them to be transported great distances. (This is not true in nonmetropolitan areas of the South, where communities are smaller, and school districts encompass whole counties.) It could also be the case that schools are more integrated into the social organization of residential neighborhoods in non-South cities, so that changes in the composition of schools are perceived as having greater implications for the composition and socioeconomic structure of neighborhoods.

The results reported in Table 4 also include considerations of the character of desegregation programs, such as the magnitude of decline in the exposure of white to black pupils, percentage of schools desegregated, percentage of minority students transported, whether several desegregation plans were implemented, and whether the major desegregation plan involved the mandatory assignment of white pupils, and whether the plan was phased in by grade level or geographic area. It can be noted that few of these variables are statistically significant in the predicted direction, implying that significant declines in white enrollment are not associated with the character of desegregation programs. Moreover, these nonsignificant findings could have resulted from the fact that this information was not available for a large number of districts that desegregated.

Long-Term Effects

Most recent studies report no significant loss of white pupils in desegregated districts beyond the year of implementation. The results reported here are consistent with these findings, except for central city districts subjected to court pressure to desegregate. Table 5 reports average annual estimates of white pupil enrollment change in desegregated districts relative to nondesegregated districts serving central cities and subjected to court pressure. For the South, a distinction is made between districts that serve entire counties including central cities, and districts that serve primarily central cities. This division is not applied to districts in the non-South because the coefficient for county reported in Table 4 is not statistically significant.

It is apparent that desegregated districts continued to experience significantly higher enrollment declines at least five years after implementing a desegregation program, although annual enrollment changes are not statistically significant in most instances (as indicated in Model II of Table 4).[11] The unusually large values reported for year T+3 for districts in the South and year T+2 for those in the non-South appear to be an aberration associated with the estimation procedure employed.[12] Four additional comments in regard to these enrollment trends are appropriate. First, county districts serving central cities lost 3 percent fewer white pupils than central city districts in the South. This is consistent with previous findings indicating that county-wide districts offer fewer alternatives to attending a desegregated school (see Rossell et al., 1981).

Second, note that southern central city districts did not actually begin to experience enrollment declines until the year of implementation

of a desegregation action, whereas non-South central cities were already experiencing declines at least six years prior to the year of implementation. This regional difference in enrollment declines prior to desegregation reflects differences in the pace and scale of the general process of suburbanization (see Sly and Pol, 1978; Taeuber and Wilson, 1978). The fact that enrollment began to decline as early as four years prior to the year of implementation indicates that families began to withdraw their children from public schools before the desegregation program was put into place. It is suspected that the intensity and duration of the controversy surrounding the implementation of a desegregation program affects both the timing and the magnitude of withdrawal of whites from public school systems. For example, most central city districts subjected to court pressure to desegregate undergo two to four years of litigation before the program is actually implemented. This allows ample time for many families to assess the situation and implement an appropriate response before the issue is finally resolved (see Rossell et al., 1981).

Third, the estimated percentage decline in white enrollment experienced by non-South central city districts during the year of segregation (T) understates the amount of change which occurred during this period. One must add the 8 percent decline reflecting the impact of increased interracial contact to the 12 percent decline associated with year (T) to obtain a total estimate of the impact of desegregation action during the implementation year. Hence, the immediate and long-term effect of school desegregation on public school enrollment in the non-South was twice as great as that occurring in the South.

Finally, the fact that the desegregated central city districts included in Table 5 continued to experience declines in enrollment after the year of desegregation indicates that the implementation of a desegregation action does have long-term implications at least with respect to differentiating these districts from nondesegregated ones. Substantial initial enrollment declines may be self-aggravating, in the sense that these districts become less attractive to whites who did not withdraw their children at the time of desegregation, but who, at some point in the future do so, as white enrollment continues to decline and as the percentage of black pupils in their children's school exceeds their level of tolerance. This is essentially what happens in the neighborhood tipping process (see Bradbury et al., 1981). In the case of central city districts in the South, desegregation may have accelerated the suburbanization process as well.

SUMMARY

The principal concern that has been addressed in this paper is whether school desegregation action leads to a reduction in the representation of whites in public school systems. In addition, an effort was made to determine whether program characteristics and involvement of a particular implementing agent were important in affecting the amount of enrollment change which occurred. Enrollment trends in nondesegregated districts were compared with those of desegregated districts in twelve subgroups, reflecting region, metropolitan status, and source of pressure to desegregate. The results support the following conclusions. First, only central city districts subjected to court pressure to desegregate experienced significant declines in white public school enrollment. This is perhaps the most important finding reported here, considering the fact

Table 5. Average Annual Estimates of White Public School Enrollment Loss Due to Desegregation (percentages) [a]

Time Period (T=Year of Desegregation)	Central Cities Subjected to Court Pressure			
	South		Non-South	
	County [b]	Non-County	Total Decline	Decline due to Desegregation [c]
T-6	13.95*	10.84*	- 4.55	
T-5	18.18*	15.07*	- 3.55	
T-4	10.34	7.23	- 9.32*	
T-3	6.93	3.82	-10.11*	
T-2	5.28	2.17	-12.41*	- 2.70*
T-1	2.30	- .81	-15.20*	- 5.49*
T	- 4.15*	- 7.26*	-22.21*	-20.50* [d]
T+1	- 6.42*	- 9.53*	-24.57*	-14.50*
T+2	- 6.79*	- 9.90*	-33.52*	-23.81*
T+3	-20.47*	-23.58	-23.55*	-13.84*
T+4	- 8.05*	-11.16*	-23.43*	-13.72*
T+5	- 8.61*	-11.72*	-30.30*	-20.59*
T+6	-10.16*	-13.27*	NA	

*Indicates that the regression coefficients used to derive these values are at least twice the size of their standard errors.

[a] The estimates were obtained by transforming the regression coefficients reported under Model I of Table 4 according to $(1-e^{\beta_1}) \times 100$.

[b] The estimated values have been adjusted for the effect of these central cities being a part of county districts.

[c] Assumes that pre-implementation year effects occur primarily after T-3.

[d] Includes an adjustment for the estimated 8% decline in enrollment due to increases in the exposure of whites to the average black child in their school.

that other districts--some situated in similar types of geographic areas, others subjected to different sources of pressure to desegregate, and still others experiencing even greater declines in the extent of racial school segregation--did not experience significant white enrollment declines.

Second, the white enrollment declines experienced by central city districts were not limited to the year of implementation, as suggested by most previous studies (see Rossell et al., 1981).[13] The declines amount to an average 6 percent reduction during the year of implementation and an average 12 percent reduction six years after that year for southern central cities; and an average 21 percent reduction for non-South central city districts during the implementation year and five years after that year. Continued declines after the year of desegregation are probably associated with avoidance behavior of potential new entrants as well as the withdrawal of pupils from the system to pursue a more desirable alternative than attending desegregated schools. It seems unreasonable to assume that attending a desegregated school will change parents' attitudes and expectations in a direction which influences families not to withdraw their children. Indeed, previous enrollment declines may render the situation even more undesirable and influence some families to withdraw. In addition, it may take several years for a family to act on its intentions because of limited resources or limited opportunities at the time a desegregation program is implemented.

Third, contrary to previous findings, most of the declines experienced by central city districts appear to be due to the fact that a desegregation action was implemented, and not to the amount of change in interracial contact associated with the action. These two findings are

consistent with another--namely, that program characteristics and implementing agent have little impact on white enrollment declines. It is suspected that the white enrollment declines observed in central city districts subjected to court pressure to desegregate have more to do with some unique features of these districts than with the involvement of the court. If court involvement was the central issue, then enrollment declines should also have occurred in districts located in suburban and nonmetropolitan areas. The location of uniracial schools and the greater importance placed on neighborhood schools in the process of residential selection and differentiation in large central cities probably requires the involvement of an agent with authority to enforce an effective remedy to school segregation. Strong opposition to school desegregation programs reflects these considerations as well as families' attitudes and expectations concerning educational experiences their children will encounter in such an environment. Furthermore, metropolitan areas offer families other alternatives to central city public schools. Families living in nonmetropolitan areas may object as strongly to desegregation, but the absence of a critical mass of pupils (or resources) needed to open a private school may leave them no other choice.

NOTES

1. Rossell computes the reassignment variables as follows: "The number of black and white students in a school in the year in which an action was taken was subtracted from the number in the school during the preceding year. The difference was attributed to administrative action if it increased racial integration. This was aggregated to the school district level and standardized as the percentage of black and white students (separately) reassigned to other race schools" (Rossell, 1978:7). The procedure had to be modified for the post-1972 years, as no information was available indicating which schools were involved in the desegregation program (Rossell, fn. 4). This modification confounds changes in the racial composition of schools due to administrative assignment policies under a desegregation plan, those due to neighborhood racial transition, and those due to reassignment policies that alter school attendance boundaries. Hence for all years after 1972, the reassignment measure is contaminated. First, the number of pupils Rossell's procedure identifies as having been reassigned does not include pupils who were reassigned but who were not enrolled during the year of desegregation. It is very probable that the number of these pupils is very correlated with annual changes in pupil enrollment. School districts' estimates of the number of pupils to be reassigned for desegregation purposes are based on their estimate of the number of pupils who will be enrolled in the year in which it occurs, while Rossell's measure is based on the number of pupils who actually enroll. Second, dividing the number of whites reassigned by the number of whites present during the year of desegregation (or by the most recent year for years T-1, T-2, T-n), as we have noted, results in an inflated estimate, since

the number of pupils available for reassignment is equal to the number present in the previous year. Hence school districts that lose significant numbers of white students between T-1 and T appear to have reassigned a larger percentage of their students. This results in inflation of the effect of white reassignment on white enrollment changes between T-1 and T by a factor which is a function of the number of pupils who were reassigned but who did not appear in year T. This bias may partly explain the small effect that the percentage of reassigned black pupils had on white enrollment change, since the black population either experienced little change or increased. Rossell's estimates of desegregation effects are also biased (in which direction we cannot ascertain) by the fact that she arbitrarily chose 1973 as the year of observation for districts that did not desegregate.

2. The bias introduced by the use of a measure of change in school segregation is of another sort. Many districts experienced several significant declines in segregation levels over several years. In some districts that desegregated, it has been estimated that less than 50 percent of the change in school segregation occurred in a given year (see Wilson, 1982). Models of the sort employed by Coleman et al. and Farley et al. bias the effect of changes in school segregation during the year of implementation because single-year observations are used in the estimation, taking no account of the fact that some districts may have experienced declines in school segregation during several time intervals. The net result is that the effect of phased-in plans or secondary plans (implemented either before or after a major plan) becomes confused with that which occurred in a given year. Coleman et al. estimates are probably biased further by use of the assumption that the annual

observations for individual districts are independent of each other. The estimates of Farley et al. are biased by serial correlation in the error term, which arises from the fact that their use of the difference between enrollment for a given year minus average enrollment does not eliminate the linear trends exhibited in their data. This can be seen by inspecting the statistical model from which they derived their dependent variable, namely

$$W_{ij} - u + \beta_i \bar{W}_{i.} + e_{ij}$$

where

W_{ij} is white enrollment for a district in year j; u is the average enrollment for all districts; $\bar{W}_{i.}$ is the average enrollment for a district; and e is the residual, or the within sums of equals (e.g., $e_{ij}=W_{ij}-(u+\beta_i\bar{W}_{i.})$ or $e_{ij}=W_{ij}-\bar{W}_{i.}$), which is used as a dependent variable. Note that while enrollment is period-specific, it is ignored in this equation. This procedure could also lead to an overstatement of desegregation effects since enrollment trends unique to each district are not explicitly taken into account.

3. It is worthwhile to note that the U.S. Commission on Civil Rights (1977) is the only study among these whose findings apply to both central city and non-central city school districts.

4. The estimates reported by Armor (1978) are highly suspect because of the projection technique used to establish a baseline for estimating enrollment losses due to desegregation.

5. There is some evidence indicating that courts in rendering decisions in desegregation cases are sensitive to these issues (see Taeuber, 1979).

6. Virtually all of the studies that use a measure of metropolitan school segregation to assess the effect of segregated suburbs on white withdrawa from central cities have reported strong negative effects of this variable. We are somewhat mystified as to exactly what is being captured by this variable. The OCR School Survey did not sample all school districts in metropolitan areas in any of its annual surveys, except 1976 when a complete enumeration was attempted. Even during the 1968, 1970, and 1972 years in which over 8,000 districts were surveyed, suburban districts were far more likely not to be sampled because of the emphasis on districts with high minority representation, and district size. Hence most estimates of the distribution of minority and white pupils across metropolitan school districts are inherently biased, because they underestimate the number of suburban districts. The negative significant effect of metropolitan segregation reported by these studies seems strangely inconsistent with results indicating the absence of long-term effects, and it is also inconsistent with results of survey research on flight to the suburbs to avoid desegregation. In order for the argument of short-term effects to be plausible, the negative coefficient should apply only to the year of desegregation. Negative coefficients on this variable for years subsequent to the year of desegregation would imply that there are long-term effects.

7. The index of dissimilarity is used to measure racial school segregation (see Taeuber and Taeuber, 1965; Taeuber and Wilson, 1981). It is defined as follows:

$$D = \frac{\sum_{i=1}^{n} T_i \left| P_i - P \right|}{2TP(1-P)}$$

where D is the index of dissimilarity; T is the number of pupils in a school, P and P are the proportion black in a school and school district, respectively; and the summation is over schools.

The exposure index was first suggested by Coleman, Kelly, and Moore (1975) as a useful measure of interracial contact. It is an unstandardized version of the "S" index used by Coleman, Kelly, and Moore (see also Zoloth, 1976; Taeuber and Wilson, 1981), and is defined as follows:

$$EWM = \frac{\sum_{i=1}^{n} W_i \frac{B_i}{T_i}}{\sum_{i=1}^{n} W_i}$$

where B_i, W_i, and T_i are the numbers of black, white, and total pupils in a school, respectively ($T_i = W_i + B_i$).

8. Rossell et al. (1981:27-29) maintain that the estimation procedure employed in the current study is seriously defective in several respects. Below we comment on each of their criticisms and show that most are due to a lack of understanding of the estimation procedure. First, these authors note that (1981:28) "in averaging white enrollment over time in a district, . . . the authors have partly taken out the desegregation effect." This problem is not unique to the estimation procedure applied here. All of the desegregation studies that make use of annual observations in multivariate analysis--including Coleman, Kelly, and Moore (1975), Rossell (1978), Farley, Richards, and Wurdock (1980), among others--also underestimate the extent of white enrollment loss during the year of desegregation. As we pointed out previously, the fact that

$\bar{W}_{i.}$ and $\bar{W}_{.j}$ are included in equation (2) allows us to minimize the extent of this bias, as the effects of these average mean values on W_{ij} in subsequent years are adjusted for by the inclusion of the desegregation status variables. We are greatly encouraged by the fact that the predicted value of W_{ij} derived from estimating equation (2) corresponds fairly closely to its observed value for most of the subgroups. The model's ability to predict white enrollment levels during the implementation year (T) is almost exact.

Rossell et al. (1981) also point out that the use of raw white enrollment as a dependent variable is problematic in several respects. The most serious problem is that the model predicts the same amount of enrollment loss in small as in large districts. We concur with these authors' interpretation. In the current discussion, this problem is avoided by expressing the dependent variable (W_{ij}) in log form. Hence the effects of the independent variables can be interpreted as percentage change in (W_{ij}) produced by a corresponding unit change in the former.

9. Additional calculations were performed to determine whether the specifications included in equation (2) biased the estimation of annual white enrollment for districts that desegregated. These calculations consisted of estimating predicted values for each observation of the thirteen subgroups to which equation (2) was applied. The predicted enrollment values in turn were expressed as ratios of the observed values. The ratio of predicted to observed values was virtually identical for desegregated and nondesegregated groups, and, within the desegregated group, for observations reflecting pre-, post-, and implementation period. In addition, the Durbin-Watson statistic was applied to the residuals to test for autocorrelation. In all instances its value was not

significantly different from zero at the .05 level. Hence, we are reasonably confident that the specifications included in equation (2) capture most if not all of the variation in enrollment which can be attributed to desegregation activities.

10. These estimates of annual enrollment loss due to the impact of increased exposure were calculated by multiplying one minus the anti-log of the coefficients for exposure reported in Table 4 by the average percentage increase in exposure which occurred in a particular subgroup of districts during the year of desegregation.

11. Before we proceed, it is important to emphasize that the temporal ordering of enrollment changes, in relation to the implementation of a desegregation action, exhibited in Table 5 is an abstraction from the concrete experiences of individual districts. Recall that the enrollment data traverses nine time periods, and the placement of individual districts along the trend line depends on the year in which a desegregation action occurs. Clearly, we are assuming that the enrollment trend of an individual district would exhibit the same pattern of change as indicated in Table 5, if it were possible to observe actual enrollment changes from T-6 to T+6.

12. Gross enrollment changes for some districts serving central cities do exhibit a similar pattern, but the differences are not as marked as those indicated in Table 5. Hence, it is suspected that the estimation procedure exaggerated the pattern exhibited in the data.

13. Rossell's reanalysis of a subsample of the 133 districts studied in a previous analysis indicate continuing enrollment declines through the fifth year of desegregation for large central city districts (cited in Rossell et al., 1981:43).

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